REMARKS

Claims 1-27 are currently pending in this application. Claims 1, 2, and 15 have been amended to more particularly point out Applicant's invention. No new matter has been added to this application.

Rejection of Claim 1 under 35 U.S.C. § 103 (s)

The Examiner has rejected claim 1 under 35 U.S.C. § 103 (a) as being unpatentable over U.S. Patent No. 4, 674, 046 (Ozeki) in view of U.S. Patent No. 6,461,298 (Fenster). The Examiner correctly notes that Ozeki does not teach or disclose displaying a plurality of views of a given object as a cine loop. The Examiner contends that Fenster discloses computing and displaying a plurality of images in time order as a cine loop. The Examiner argues that it would have been obvious to one of ordinary skill in the art to display the plurality of view in Ozeki as a cine loop. Applicants respectfully traverse the rejection.

The present invention is directed to a computer assisted diagnosis system and method for assisting diagnosis of three-dimensional digital image data. Three-dimensional objects within the three-dimensional image data are identified. For a given three-dimensional object, a local spinning plane for the given object is determined. The local spinning plane is centered at a centroid and a local spinning axis of the given object. The local spinning plane is rotated at least a portion of 360 degrees. A view of the given object at predefined increments of rotation is created so as to result in a plurality of views of the given object at predefined angles of the rotation that are displayed in sequence as a cine loop. The present invention takes incremental angles and uses the angles to order frames within the cine loop.

Ozeki discloses a method for obtaining three dimensional tomographic images by interpolation of a plurality of projection slices. An orientation angle of the image can be changed by manually inputting coordinate information. A slice position image representing the designated position and angle of the slice is

displayed three-dimensionally in accordance with the coordinate information. As indicated in Applicants' previous response, Ozeki teaches using individual angles that are manually selected by the user and does not teach or disclose presenting the plurality of views as a cine loop. As such, Applicants submit that Ozeki does not teach or disclose Applicants' invention as claimed.

Fenster discloses a three dimensional ultrasound imaging system that includes an ultrasound probe. The ultrasound probe is swept over the target volume to create two dimensional images of the target volume. The two dimensional images are used to generate a three dimensional image. The three dimensional images can be computed and displayed in time order as a cine loop.

Applicants respectfully submit that the cine loop of the images disclosed in Fenster is significantly different than that of the present invention. Fenster discloses displaying images acquired at different times in a cine loop shown in time order. The present invention uses different projections of an image that are all acquired at the same time as indicated by the recitation of "creating a view of the given object at predefined increments of rotation, so as to result in a plurality of views of the given object" as recited in claim 1. When images are acquired at the same time, there is no time order. Furthermore, the present invention discloses taking views at incremental angles of a rotation and using a non-temporal quantity, in this case the angle, to order the frames within the cine loop rather than using the acquisition time to order the cine loop. Applicants have amended claim 1 to indicate that the plurality of views are taken at predefined angles of the rotation which are then displayed in sequence as a cine loop. Applicants respectfully submit that neither Ozeki nor Fenster, whether taken alone or in combination, teach or disclose Applicants' invention and request that the rejection of claim 1 under 35 U.S.C. § 103 (a) be withdrawn.

Rejection of Claims 2-27 under 35 U.S.C. § 103 (a)

The Examiner has rejected claims 2-27 under 35 U.S.C. § 103 (a) as being unpatentable over Ozeki in view of Fenster and further in view of U.S. Patent No. 5,838,815 (Gur). The Examiner correctly notes that neither Ozeki nor Fenster teach or disclose receiving indicia identifying at least one region of interest in a digital medical image or identifying three dimensional objects with in the least region of interest. The Examiner contends that Gur teaches obtaining a mammogram image and identifying suspicious masses in the breast region. The Examiner argues that it would be obvious to a person of ordinary skill in the art to apply the combined Ozeki's and Fenster's system to perform image processing on the objects disclosed in Gur by presenting the object in different viewing angles to the physician to determine if the object is abnormal. Applicants respectfully traverse the rejection.

As indicated above, Ozeki does not teach or disclose displaying the plurality of views as a cine loop as recited in amended independent claims 2 and 15. Applicants further submit that the combination of Ozeki and Fenster do not teach or disclose displaying a plurality of views taken at predefined angles of the rotation in sequence as a cine loop. Gur discloses a method of detecting an abnormal region in living tissue as depicted in a digital radiograph. In the Gur method, a suspected abnormal region is identified and multiple topographic layers of the suspected abnormal region are extracted from the digital radiograph. Features of the region are determined in each of the layers and an inter-layer multivariate criterion is applied to the features to determine if the suspected abnormal region in fact is an abnormal region. As indicated in Gur, each layer is examined individually to determine its features and is analyzed multiple times. However, no teaching or disclosure is made of displaying the layers in a cine loop.

The Examiner also contends that Ozeki teaches performing linear interpolation on the tomographic slices. Applicants respectfully submit that

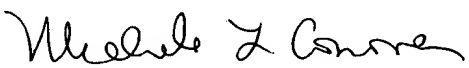
interpolation of 3D data is not the same thing as connected components within a volume. Interpolation merely resamples the data to change the resolution to be higher or lower than the original format. Interpolation does not determine the extent of objects within the data. Connected components determine for every voxel within the image volume which voxels are part of the same object. Connected components also compute how many distinct objects are within the volume. The output of connected components computation is a labeling of each voxel according to the unique component to which it belongs. This is not the case in interpolation. Applicants submit that neither Fenster nor Gur teach connected components either.

Applicants respectfully submit that Gur, like Ozeki and Fenster, does not teach or disclose displaying a plurality of views taken at predefined angles of the rotation in sequence as a cine loop. Furthermore, the combination of Ozeki, Fenster and Gur do not each Applicants' invention. In addition neither Gur nor Ozeki nor Fenster, whether taken alone or in combination, teach or disclose angles of the rotation in sequence as a cine loop as recited in displaying a plurality of views taken at predefined independent claims 2 and 15. Claims 3-14 and 16-27 being dependent upon independent claims 2 and 15 respectively are also not taught or disclosed by the combination of Ozeki, Fenster and Gur. Applicants request that the rejection of claims 2-27 under 35 U.S.C. § 103 (a) be withdrawn.

Conclusion

Applicant respectfully submits that claims 1-27, as amended are in condition for allowance and request that a timely Notice of Allowance be issued in this case. The Examiner is invited to contact the undersigned should he have any questions in this matter.

Respectfully submitted,



Michele L. Conover
Reg. No. 34,962
Attorney for Applicant

Date: May 10, 2004
Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
Iselin, New Jersey 08830
(732) 321-3013